June 26, 2015

Stanford teams up with San Francisco schools to prepare math teacher-leaders

A $3 million grant will support building the capacity of math teachers to conduct professional development aligned to the Common Core.

BY BROOKE DONALD

Teachers participate in a CSET professional development program on the Stanford campus. CSET has now partnered with San Francisco schools to develop math teacher-leaders.

Schools and districts across the United States are being challenged by new education standards to improve the quality of math teaching and learning.
While understanding math facts is a fundamental part of learning, for students to meet the Common Core State Standards teachers must also incorporate mathematical thinking and problem solving into their instruction. To support these changes, school and district leaders are seeking professional development opportunities for their teachers.

That's where researchers at Stanford University's Center to Support Excellence in Teaching (CSET) come in. With a new $3 million grant from the National Science Foundation, the researchers will work with middle school math teachers in San Francisco to develop their capacity to conduct professional development for the teachers in their schools. This project builds on two connected models developed by Hilda Borko, professor at Stanford Graduate School of Education, and colleagues at the University of Colorado and Hunter College.

The Mathematics Leadership Preparation (MLP) model for building local capacity creates a sustainable professional development program that is embedded in the school district so that teachers have the preparation they need to deeply engage students in math in the ways identified in the standards.

The teacher leaders will learn to enact the Problem Solving Cycle (PSC) model of professional development. “The PSC approach supports a very different way of teaching, which puts student thinking in the foreground,” explains Janet Carlson, associate professor at Stanford GSE, and director of CSET.

Borko, Carlson, Professor Claude Goldenberg, and a team of graduate students and CSET staff will work with the San Francisco math leadership team to adapt the PSC and MLP models and implement them in the district. In the second half of the project they will study the impact of the program on teacher practice and student learning.

The project takes advantage of a research partnership Stanford GSE has with San Francisco Unified that allows the district to identify issues it needs addressed and researchers to develop a strategy to study or address them.

In an interview, Carlson and Borko explain the details of the project. Excerpts are below.

How is the Common Core changing the way math is taught and learned?

Carlson: The Common Core standards support the teaching of mathematics for conceptual understanding. Teachers need to engage students to construct mathematical arguments and critique the reasoning of others. One way to do this is to use a small number of rich math problems as the foundation of the math curriculum. San Francisco has developed a new middle school math curriculum that is based on rich math tasks. This curriculum will be the foundation of our work.

Borko: The Common Core includes standards for both math content and math practices. These are very different aspects of understanding mathematics. It can be quite a challenge for teachers to implement the math practices, as they require changes in both instruction and curriculum in which students work in small groups to solve and discuss rich math problems.

How will your project help teachers effectively teach in this new environment?

Carlson: We’ll be working collaboratively with the SFUSD to implement the professional development (PD) in conjunction with their new curriculum. We’ll be integrating this project by building on the district’s plan for math PD and working with five lead teachers at just two schools in year 1. These teachers will work with the other teachers in their schools on math tasks and on analyzing video of their own classrooms to deepen their math content knowledge and use of
mathematical practices.

*Borko:* Our professional development program is specifically focused on teaching with problems and on helping teachers support the math practices. To help students learn to give mathematical explanations or critique the explanations of others, for example, teachers must design activities in which students work together to solve math problems. The professional development leaders in our program will model how to set up group problem solving activities. They will lead PD workshops in which the teachers watch video clips from their lessons, and use them as a springboard for examining students’ mathematical reasoning and their engagement in the math practices.

**How will the project unfold?**

*Carlson:* This spring we’ve been working with SFUSD leaders using an approach called design-based implementation research, or DBIR, to tackle a “persistent problem of practice.” We’ve attended the district’s current PD sessions and talked to district personnel about what is going well in classrooms and what is still challenging. Our next step is to work with the math leaders from two middle schools to lead professional development with teachers from their schools. We’ll start with a summer institute and then support them through math leader workshops for the first couple of years as they implement professional development in their schools.

**How many schools will be involved?**

*Carlson:* We plan to start in two middle schools this fall, then expand the following academic year. By the end of the project, the PSC will be used for math PD in all of the middle schools.

**What makes for high quality professional development?**

*Borko:* High quality professional development is long term. Teachers work collaboratively, on an ongoing basis, to improve their teaching. Too often, professional development programs bring in experts to give a single lecture or workshop for teachers. Research indicates that this is not good professional development.

*Carlson:* When you design professional development you really want to back up a level and ask, “What is the vision of teaching and learning I am trying to achieve?” So in this case, it’s what does it look like when a student is learning, really learning, this math? Then you look at the teaching to examine the ways in which practice is getting to the place where that vision of learning is realized.

**Are there basic tenets to adhere to for a good professional development program?**

*Carlson:* There is a body of research around professional development. We have highlighted a number of key features associated with high-quality PD including that it is driven by a vision for classroom learning and teaching, situated in teachers’ practice, focused on student learning, designed so that teachers develop knowledge and skills through active participation, models desired instructional practice, mirrors methods to be used by students, builds a learning community, develops teacher leadership, links to the system so it is sustainable, and is continually assessed.

**If the Common Core is new, how do you know this professional development strategy will be effective?**

*Borko:* This is not a new approach to learning; it’s just new to a lot of teachers. The Stanford Teacher Education
Program, for example, has been preparing teachers to instruct with small group learning activities for a long time. We do have evidence that this type of teaching is effective in supporting student learning. It’s just not widespread, but that’s changing with the Common Core.

What do you hope to learn from this project in terms of advancing professional development in districts implementing the Common Core, and how do you think this project can contribute to scholarship on teaching and learning?

Carlson: CSET focuses on supporting excellence in teaching. This partnership with SFUSD builds on the work of the center to develop and study effective PD in support of student learning. There are three primary contributions this project could make to the scholarship related to teaching and learning. Right now, it’s most appropriate to articulate those potential contributions as questions:

- How effective is the Problem-Solving Cycle approach in supporting teacher practice that is aligned with Common Core mathematics approaches?
- How effective is this model in building district capacity to conduct meaningful PD in support of a new curriculum in mathematics?
- How effective are the changes in teaching practice and math curriculum in improving student learning, especially those who are also learning English?

We’ll be monitoring and adjusting this project over its duration as new questions or new needs emerge from the district and/or preliminary data analysis.

Contact

Jonathan Rabinovitz, Director of Communications, Stanford Graduate School of Education: 650-724-9440, jrabin@stanford.edu

Update your subscription

Email news@gse.stanford.edu
Or phone 650-724-9440

More GSE coverage